

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

REC'D 15 APR 2004

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Applicant's or agent's file reference AJF59124/006	FOR FURTHER ACTION <small>See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)</small>	
International application No. PCT/GB 03/01200	International filing date (day/month/year) 19.03.2003	Priority date (day/month/year) 28.03.2002
International Patent Classification (IPC) or both national classification and IPC H02J3/38		
Applicant MICROGEN ENERGY LIMITED et.al		

1. This International preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I Basis of the opinion
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

Date of submission of the demand 06.10.2003	Date of completion of this report 14.04.2004
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I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-19 as originally filed

Claims, Numbers

1-13 as originally filed

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	12 : no
Inventive step (IS)	Yes: Claims	
	No: Claims	1-11,13 : no
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

D1: WO 01 61820 A (POWERLINE GES PTY LTD ;CHAMBERS COLIN JAMES (AU); COLIN RICHARD ER) 23 August 2001 (2001-08-23)

D2: SWEET W: 'Networking assets distributed generation' IEEE SPECTRUM, JAN. 2001, IEEE, USA, vol. 38, no. 1, pages 84-86, 88, XP002245189 ISSN: 0018-9235

D3: LASSETER R H: 'MicroGrids' 2002 IEEE POWER ENGINEERING SOCIETY WINTER MEETING. CONFERENCE PROCEEDINGS (CAT. NO.02CH37309), PROCEEDINGS OF WINTER MEETING OF THE POWER ENGINEERING SOCIETY, NEW YORK, NY, USA, 27-31 JAN. 2002, pages 305-308 vol.1, XP010578286 2002, Piscataway, NJ, USA, IEEE, USA ISBN: 0-7803-7322-7

D4: US-A-4 641 322 (HASEGAWA SATOSHI) 3 February 1987 (1987-02-03) cited in the application

D5: LASSETER B: 'Microgrids distributed power generation' 2001 IEEE POWER ENGINEERING SOCIETY WINTER MEETING. CONFERENCE PROCEEDINGS (CAT. NO.01CH37194), PROCEEDINGS OF 2001 WINTER MEETING OF THE IEEE POWER ENGINEERING SOCIETY, COLUMBUS, OH, USA, 28 JAN.-1 FEB. 2001, pages 146-149 vol.1, XP002245190 2001, Piscataway, NJ, USA, IEEE, USA ISBN: 0-7803-6672-7

2. The present application does not meet the requirements of Art. 33(3) PCT and Art. 33(2) PCT, since the subject-matter of **independent apparatus claim 1** lacks inventive step and the subject-matter of **independent method claim 12** lacks novelty, as it will be explained hereinafter.

2.1 Document D1 is considered to be the closest prior art in respect of the present claim 1.

2.2 D1 discloses a system for the generation and distribution of energy to a region (local area). It includes a plurality of embedded generators which produce electrical and thermal energy. The region (local area) is formed of a plurality of

sub-regions (sites).

Thus, in respect of independent apparatus **claim 1**, document **D1** shows (the references in parentheses applying to this document, cf. Fig. 1, page 1, line 24-page 2, line 5; page 2, line 20-page 9, line 9; page 10, line 27- page 12, line 8; page 13, lines 4-7; page 14, line 10-page 15, line 19):

- a power distribution/generation system (system 10) for supplying electrical power to a number of sites (sub-regions 12),
- at least some of the sites comprising a generator (GES units 11),
- the generators being linked together on a local network (secondary distribution network 16; region 100),
- the local network being connected to an external power grid (page 11, lines 21-23: the second distribution system connected to a remote mains supply; page 4, lines 21-22), and
- a controller (global controller 28; page 14, lines 10-12) to control the distribution of power so that
 - a site is supplied with electrical power from the local network if its demand exceeds the power generated by that site's generator (page 8, lines 19-23; page 12, lines 4-5), and
 - power is drawn from the grid if the total power demand of all the sites exceeds the power generated by all of the generators (page 12, lines 5-8)

2.3 The system of claim 1 differs from this prior art in that at least some of the generators in the power/distribution system are Stirling engines.

2.4 The problem to be solved by the present claim 1 over the prior art is implementation of Stirling combustion engines in the distributed generation system.

2.5 **D2** shows Stirling engines being used for distributed generation (page 84, column 2; page 85, sole figure and page 86, column 2, paragraph 3). Therefore, the person skilled in the art would regard it a normal design procedure to use the Stirling engines as a distributed energy source as disclosed in **D2**.

Consequently, the subject-matter of claim 1 does not involve an inventive step (Art. 33(3) PCT).

2.6 In respect of independent method **claim 12**, document **D1** discloses:

- a method for supplying electrical power to a number of sites (sub-regions), the method comprising the steps:
 - monitoring the power generated by each generator (page 2, lines 20-27),
 - monitoring the power demand at each site (page 7, lines 6-7),
 - controlling the distribution of power so that
 - a site is supplied with electrical power from the local network if its demand exceeds the power generated by that site's generator (page 12, lines 4-5), and
 - power is drawn from the grid if the total power demand of all the sites exceeds the power generated by all of the generators (page 12, lines 5-8)

Therefore, claim 12 is not new in view of Art. 33(2) PCT.

2.7 Dependent **claims 2-11 and 13** do not contain any feature which, in combination with the features of any claim to which refer, meets the requirements of the PCT in respect of novelty or inventive step, the reasons being as follows:

Claim 2 defines a linear free piston Stirling engine. This feature is well known in the art as it is specified in the description of the application (see page 8, lines 5-8).

Claim 3 defines that the controller is arranged to export excess power to the grid if the power generated exceeds the power demand of the local network. This feature is disclosed by **D1** (page 12, lines 5-8).

D2 also discloses this feature (see page 85, "Power grids of the Future will Mix and Match" section: "feeding any surplus back into the network").

Claim 4 defines that all of the generators in the local network are routed through a hub which is then connected to the grid. **D1** shows a global controller 28, defined as the gateway of the individual a GES Units 11 and contains the software to control the overall system 10 (see page 14, lines 10-12).

Claim 5 defines means to detect absence of mains power, whereby the controller is arranged to operate in the absence of mains power to supply electrical power to selected electricity consuming apparatus. It is not clear if the absence of mains power is related to the grid, to the local area grid or site level. However, **D3** shows

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a microgrid able to work in island mode after detection of power quality or faults on the utility grid (see page 305, column 2, Fig. 1, paragraph 1 and page 307, column 2, section: V. PROTECTION, paragraph 1). D1 (page 5, lines 9-11) also discloses detection of a break in the distribution system and generator operating in stand-alone mode to maintain power to its individual sub-region.

Claim 6 defines that upon detection of the absence of mains power the controller is arranged to selectively supply power to certain designated emergency sockets within a site. This feature is disclosed by D1 (see page 13, lines 3-7: "control priority can be altered to suit loads which require reliable no-break power").

The feature of **claim 8** is disclosed by D4. D4 (abstract) shows the power lines used as a carrier for the communications signals.

The features of **claims 9 and 13** are disclosed by D5. D5 defines power storage means combined with micro-sources providing peak power and ride-through capabilities during disturbances (see page 147, paragraph 3 and 5).

Claim 11 defines conventional power storage technologies: batteries, flywheels, pumped storage, etc. This feature is disclosed by D3 (see page 306, column 2, paragraph 3).

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